Propagation Effects Handbook for Satellite Systems Design

Louis J. Ippolito
Stanford Telecom

ELEVENTH ACTS PROPAGATION STUDIES WORKSHOP

October 23, 1998
Oklahoma City, OK

Basic Goals for Revised NASA Propagation Handbook

- Combine Scope of the Previous Two NASA Handbooks into a Single Comprehensive Document
- Eliminate Duplication
- Provide a More Cohesive Structure for the Reader
  - Offer Several Levels of "Entrance" into Handbook
- Include Tailored Propagation Analysis Procedures For Specific Types of Satellite Applications

Prior Editions
Above 10 GHz Handbooks

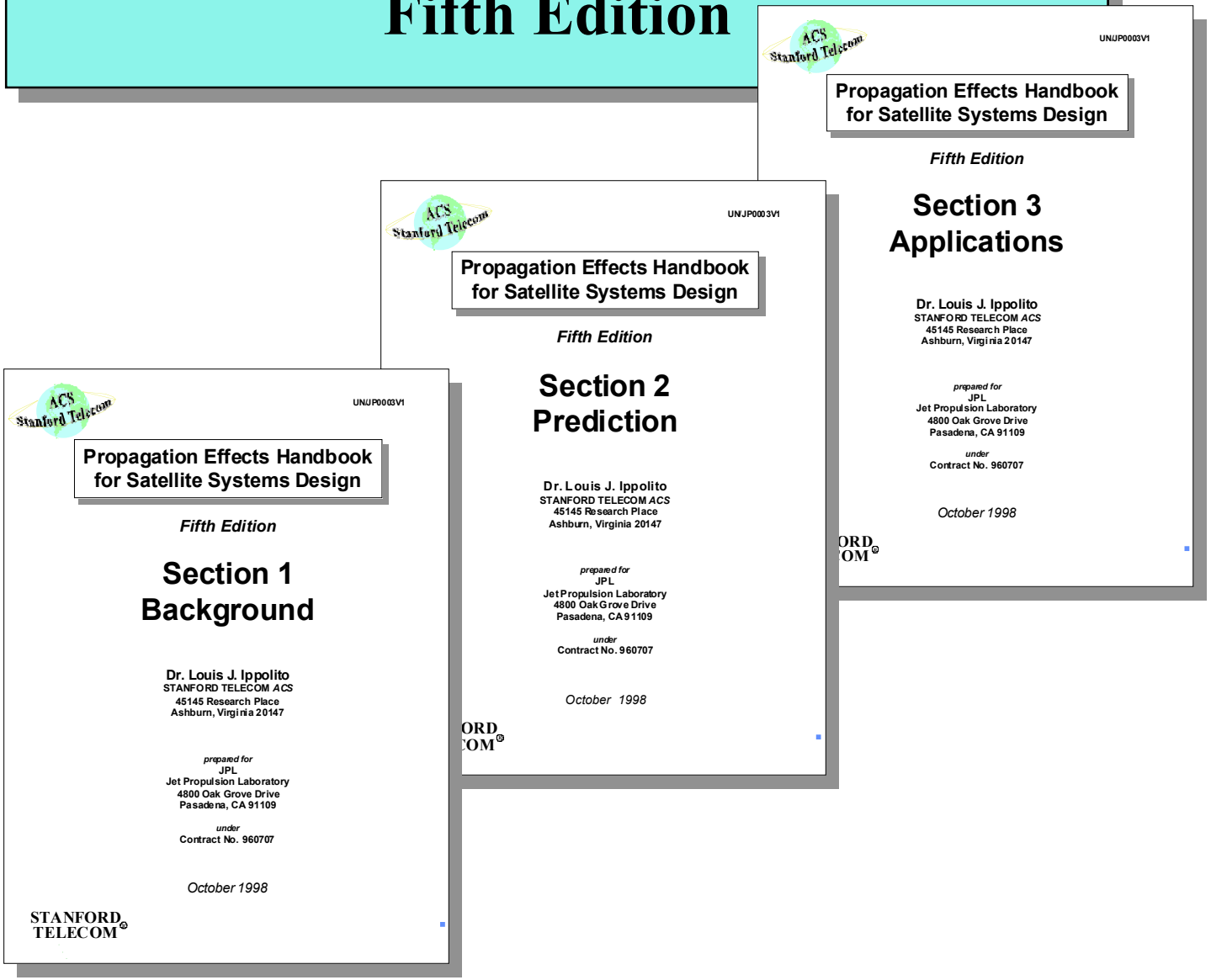
- **First Edition** — **ORI Technical Report TR 1679**
  R. Kaul, R. Wallace, G. Kinal
  March 1980
- **Second Edition** — **NASA Reference Publication 1082**
  L. Ippolito, R. Kaul, R. Wallace
  December 1981
- **Third Edition** — **NASA Reference Publication 1082(03)**
  L. Ippolito, R. Kaul, R. Wallace
  June 1983
- **Fourth Edition** — **NASA Reference Publication 1082(04)**
  L. Ippolito
  February 1989

Prior Editions
Below 10 GHz Handbooks

- **First Edition** NASA Reference Publication 1108
  W. Flock
  December 1983

- **Second Edition** NASA Reference Publication 1108(02)
  W. Flock
  December 1987

Fifth Edition



Basic Structure of Handbook

Three Sections

SECTION 1 BACKGROUND

Provide Overview of Propagation Effects, including Theory and Basic Concepts, Propagation Measurements, Available Data Bases.

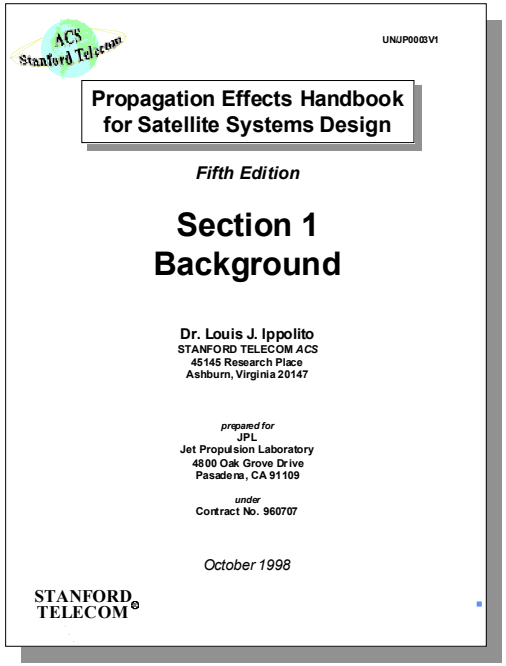
SECTION 2 PREDICTION

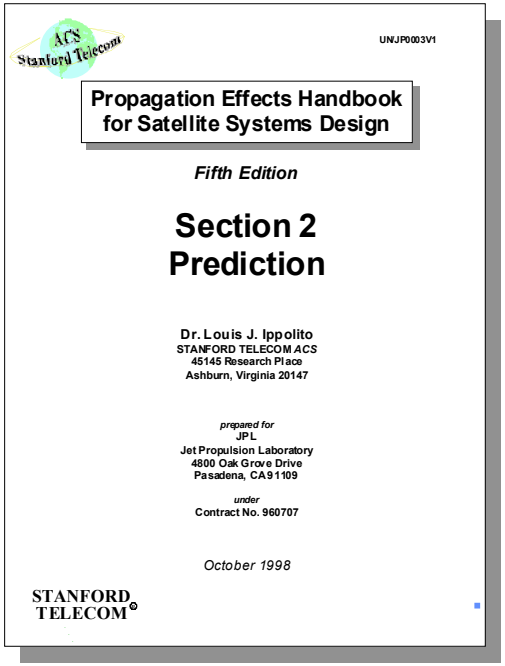
Provide Descriptions of Prediction Models and Techniques, Organized By Effect. Provide Step-by-Step Procedures For Each, Where Appropriate. Include Sample Calculations.

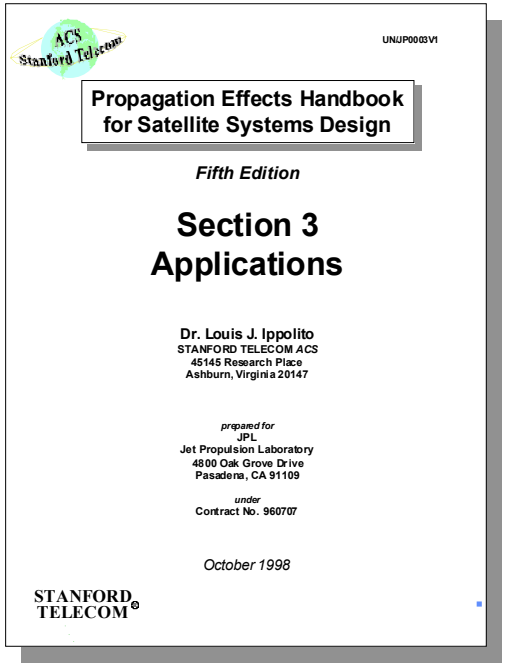
SECTION 3 APPLICATIONS

Provide "Roadmaps" {i.e. flow charts} of Application of Prediction Models in SECTION 2 to Specific Satellite Systems and Applications. Include Evaluation and Impact on Systems Design and Performance. Include Sample Calculations.

Three Section Structure







Researcher, General Interest ***Enters Here***

Link Analyst ***Enters Here***

Systems Designer ***Enters Here***

Fifth Edition Handbooks

- **Section 1 Background**
  - **Six Major Subsections** — **118 pages**
- **Section 2 Prediction**
  - **Six Major Subsections** — **226 pages**
- **Section 3 Applications**
  - **Eight Major Subsections** — **43 pages**
  -

387 pages

Handbook Highlights

Status and Future Plans

- Handbook Delivered to JPL October 23 1998
- Electronic Versions on-line
  - JPL
  - Stel
- On-going Peer Review
- Plan for Modifications and Enhancements
  - Revise current Edition
    - Corrections, Minor Changes
  - Develop Sixth Edition
    - Enhancements, Updated Models, New Areas